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EFFECT OF A STANDARDIZED BODY MASS INDEX- AND HEART RATE-BASED PROTOCOL ON RADIATION DOSE AND DIAGNOSTIC ACCURACY OF CORONARY COMPUTED TOMOGRAPHIC ANGIOGRAPHY: A PROSPECTIVE MULTICENTER STUDY

ACC Poster Contributions
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Session Title: CT Coronary Angiography: Radiation Exposure and Special Uses
Abstract Category: CT Coronary Angiography
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Background: Coronary computed tomographic angiography (CCTA) is associated with non-negligible radiation. The effect of radiation dose reduction strategies on the diagnostic accuracy of CCTA is not well established.

Methods: We evaluated 81 consecutive patients from multiple sites with both 64-detector high-definition CCTA and catheter angiography in two distinct phases. After CCTA studies in 30 patients using site-specific practice, we initiated a uniform standardized protocol which prescribed current and voltage by body mass index (BMI), and gating technique and padding duration by heart rate (HR). Diagnostic performance and radiation doses were compared before versus after protocol initiation. 2 blinded, independent readers interpreted CCTA studies; a third reader obtained consensus. A blinded core lab performed quantitative coronary angiography. Maximal diameter stenosis of each coronary segment by CCTA was graded as <50% or ≥50%. All segments and stents were included for the final efficacy analysis in intent-to-diagnose fashion; non-evaluable segments on CCTA were assumed to have ≥50% stenosis.

Results: Results are listed in the table. Post-protocol CCTA studies were associated with a lower radiation dose, and no difference in interpretability or diagnostic performance.

Conclusions: A standardized BMI- and HR-based protocol for CCTA results in radiation dose reduction without compromising diagnostic accuracy.

	Pre-Protocol	Post-Protocol	p
Patient Variables			
Age, years	56 ±15	62±13	0.048
Male Gender	80	73	0.60
Heart Rate, beats/minute	58 (51-64)	56 (50-62)	0.15
Body Mass Index, kg/m2	28 ±4	27 ±4	0.18
Scan Parameters			
Prospective Gating	70	75	0.80
100 (vs. 120) kV Voltage	20	53	<0.001
Padding Duration, msec	100 (75-125)	0 (0-50)	<0.001
Current, mA	601 (588-625)	550 (480-605)	<0.001
Radiation Dose, mSv	5.4 (3.3-8.3)	2.0 (1.3-3.9)	<0.001
Evaluable Segments	99 (337/341)	97 (620/641)	0.06
Patient-Based Diagnostic Performance			
Sensitivity	100 (17/17)	100 (21/21)	1.0
Specificity	92 (12/13)	87 (26/30)	1.0
Segment-Based Diagnostic Performance			
Sensitivity	80 (37/46)	79 (38/48)	1.0
Specificity	95 (280/295)	93 (552/593)	0.31

Values provided as mean ±SD, median with interquartile range, or % (n).